

DETAILED ACTION

1. All outstanding rejections except for those described below are overcome by applicants' amendment filed 4/22/02.

The following rejection is non-final, however, in light of the use of a new reference against the present claims, namely, Moffatt et al. (U.S. 6,323,257) which was published after the mailing date of the previous office action as well as the new grounds of rejection as set forth in paragraphs 3 (b) and 14 below.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9-11, 30-33 and 38-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claim 9, which ultimately depends on claim 1, recites that the second chemical group comprises polymer such as polyalkylene oxide, polyol, and polyacrylate. Claim 1, as presently amended, recites that the second chemical group comprises organic group selected from the group consisting of acyl azides, isocyanates, etc. The scope of claim 9 is confusing because it is not clear what the second chemical group comprises. Does the second chemical group comprise both polymer as recited in claim 9 and organic group as recited in claim 1? Clarification is requested.

(b) Claims 30 and 38 recite that the organic group is the "reaction product of at least one electrophile and a nucleophilic polymer; and an acylating agent". Due to the presence of the semi-colon, it is not clear if or how the acylating agent reacts with the electrophile and nucleophilic polymer. From the present specification, it appears that the acylating agent reacts with the reaction product formed by the reaction of the electrophile and nucleophilic polymer. Thus, it is suggested that the above phrase is re-written as "reaction product of at least one electrophile and a nucleophilic polymer which is then further reacted with an acylating agent".

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 5, and 8-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Moffatt et al. (U.S. 6,221,932).

The rejection is adequately set forth in paragraph 5 of the office action mailed 10/16/01, Paper No. 3, and is incorporated here by reference.

6. Claims 1, 5, 8-9, 12, and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 99/31175.

The rejection is adequately set forth in paragraph 7 of the office action mailed 10/16/01, Paper No. 3, and is incorporated here by reference.

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7. Claims 21-22, 24, 34-35, and 40-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Moffatt et al. '257 (U.S. 6,323,257).

Moffatt et al. '257 disclose modified pigment and ink jet ink comprising modified pigment wherein the modified pigment has attached at least one directly attached organic group which is the reaction product of (2-sulfatoethyl)-sulfone group and at least one nucleophilic polymer such as polyalkylene glycol (col.4, lines 12-23 and 42-42, col.6, lines 6-12 and 30, and col.16, lines 25-30).

In light of the above, it is clear that Moffatt et al. '257 anticipates the present claims.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 23 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moffatt et al. '257 (U.S. 6,323,257).

The disclosure with respect to Moffatt et al. in paragraph 7 above is incorporated here by reference.

The difference between Moffatt et al. '257 and the present claimed invention is the requirement in the claims of specific type of (2-sulfatoethyl) sulfone group.

Moffatt et al. '257 disclose the use of phenyl (2- methyl ethyl sulfanato) sulfone while the present claims require the use of phenyl (2-sulfatoethyl) sulfone. Thus, the compound of Moffatt et al. '257 contains a methyl substituent not present on the instantly claimed compound.

Given the similarity between the claimed compound and that disclosed by Moffatt et al. '257 and given that the compound of Moffatt et al. '257 is used as a first chemical group on a pigment which is then reacted with second chemical group, which is the identical function of the presently claimed compound, it would have been natural for one of ordinary skill in the art to infer that the presently claimed compound is just an obvious variant of that in Moffatt et al. and to expect that the phenyl (2-methyl ethyl sulfonato) sulfone of Moffatt et al. '257 would have similar properties as the phenyl (2-sulfatoethyl) sulfone presently claimed.

In light of the above, and absent evidence to the contrary, it therefore would have been obvious to one of ordinary skill in the art to use phenyl (2-sulfatoethyl) sulfone in Moffatt et al. '257, and thereby arrive at the claimed invention.

10. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moffatt et al. '257 (U.S. 6,323,257) in view of Moffatt et al. (U.S. 6,221,932).

The disclosure with respect to Moffatt et al. in paragraph 7 above is incorporated here by reference.

The difference between Moffatt et al. '257 and the present claimed invention is the requirement in the claims of specific type of polymer.

Moffatt et al., which is drawn to ink composition comprising modified pigment, disclose attaching polymer such as polyethyleneimine to pigment in order to produce an ink with increased smearfastness, enhanced print quality, and improved bleed control. Moffatt et al. further disclose the equivalence and interchangeability of polyalkylene glycols, as disclosed by

Moffatt et al. '257, with polyethyleneimine (col.1, lines 15-23, col.5, lines 43-44, 53, and 63-65, and col.6, lines 45-55).

In light of the motivation for using specific type of polymer disclosed by Moffatt et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such polymer in the pigment of Moffatt et al. '257 in order to produce an ink with increased smearfastness, enhanced print quality, and improved bleed control, and thereby arrive at the claimed invention.

11. Claims 1, 5-9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moffatt et al. '257 (U.S. 6,323,257) in view of WO 99/31175.

Moffatt et al. '257 disclose a method of producing a modified pigment comprising reacting first chemical group such as (2-sulfatoethyl)-sulfone group with second chemical group, i.e. nucleophilic polymer such as polyalkylene glycol, in order to form third chemical group (col.4, lines 12-23 and 42-42, col.6, lines 6-12 and 30, and col.16, lines 25-30).

The difference between Moffatt et al. '257 and the present claimed invention is the requirement in the claims (a) that the first chemical group is attached to the pigment using diazonium salt and (b) specific type of (2-sulfatoethyl) sulfone group.

With respect to difference (a), Moffatt et al. '257 is silent with respect to how the first chemical group is attached to the pigment.

WO 99/31175 disclose attaching chemical groups to carbon black by using diazonium salt. It is further disclosed that this method is used given that diazonium salt can react with carbon black in a variety of reaction conditions and in any type of reaction medium and further

given that diazonium salt is compatible with wide variety of functional group (page 4, lines 20-24, page 7, lines 2-4, and page 9, lines 14-16).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use diazonium salt to attach the first chemical group to the pigment of Moffatt et al. '257, and thereby arrive at the claimed invention.

With respect to difference (b), Moffatt et al. '257 disclose the use of phenyl (2- methyl ethyl sulfanato) sulfone while the present claims require the use of phenyl (2-sulfatoethyl) sulfone. Thus, the compound of Moffatt et al. '257 contains a methyl substituent not present on the instantly claimed compound.

Given the similarity between the claimed compound and that disclosed by Moffatt et al. '257 and given that the compound of Moffatt et al. '257 is used as a first chemical group on a pigment which is then reacted with second chemical group, which is the identical function of the presently claimed compound, it would have been natural for one of ordinary skill in the art to infer that the presently claimed compound is just an obvious variant of that in Moffatt et al. and to expect that the phenyl (2- methyl ethyl sulfanato) sulfone of Moffatt et al. '257 would have similar properties as the phenyl (2-sulfatoethyl) sulfone presently claimed.

In light of the above, and absent evidence to the contrary, it therefore would have been obvious to one of ordinary skill in the art to use phenyl (2-sulfatoethyl) sulfone in Moffatt et al. '257, and thereby arrive at the claimed invention.

12. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moffatt et al. '257 in view of WO 99/31157 as applied to claims 1, 5-9, and 12 above, and further in view of Moffatt et al. (U.S. 6,221,932) .

The difference between Moffatt et al. '257 and the present claimed invention is the requirement in the claims of specific type of polymer.

Moffatt et al., which is drawn to ink composition comprising modified pigment, disclose attaching polymer such as polyamine and polyethyleneimine to pigment in order to produce an ink with increased smearfastness, enhanced print quality, and improved bleed control. Moffatt et al. further disclose the equivalence and interchangeability of polyalkylene glycols, as disclosed by Moffatt et al. '257, with polyethyleneimine (col.1, lines 15-23, col.5, lines 43-44, 53, and 63-65, and col.6, lines 45-55).

In light of the motivation for using specific type of polymer disclosed by Moffatt et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such polymer in the pigment of Moffatt et al. '257 in order to produce an ink with increased smearfastness, enhanced print quality, and improved bleed control, and thereby arrive at the claimed invention.

13. Claims 1, 5, 8-9, 12, 14-15, 20, 30-33, and 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. (U.S. 5,952,429) in view of WO 99/31175.

Ikeda et al. disclose a method for making a modified pigment comprising reacting a carbon black pigment which comprises an electrophilic functional group with polymer which comprises nucleophilic reactive group. It is disclosed that this product is then further reacted

with an additional organic group such as succinic anhydride. The polymers include poly(meth)acrylate and polyalkylene glycol. It is further disclosed that the modified pigment is suitable for use in ink jet ink (col.8, lines 29-36, col.8, line 61-col.9, line 2, col.12, lines 23-40, col.3, lines 36-42, col.6, lines 33-38, col.17, lines 31-62, col.20, lines 17-23, col.30, line 29, col.42, lines 6-15, col.43, lines 49-50, and col.54, lines 39-41).

The difference between Ikeda et al. and the present claimed invention is the requirement in the claims that the first chemical group is attached to the pigment using diazonium salt.

Ikeda et al. is silent with respect to how the first chemical group is attached to the pigment.

WO 99/31175 disclose attaching chemical groups to carbon black by using diazonium salt. It is further disclosed that this method is used given that diazonium salt can react with carbon black in a variety of reaction conditions and in any type of reaction medium and further given that diazonium salt is compatible with wide variety of functional group (page 4, lines 20-24, page 7, lines 2-4, and page 9, lines 14-16).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use diazonium salt to attach the first chemical group to the pigment of Ikeda et al. and thereby arrive at the claimed invention.

Response to Arguments

14. Applicants' arguments regarding Bruhnke et al. (U.S. 5,766,268), Kwan et al. (U.S. 6,235,829), WO 99/51690, and Aida et al. (U.S. 5,716,435) have been considered but they are moot in view of the discontinuation of these references against the present claims.

15. Applicants' arguments filed 4/22/02 have been fully considered but, with the exception of arguments relating to Bruhnke et al., Kwan et al., WO 99/51690, and Aida et al., they are not persuasive.

Specifically, applicants argue that:

- (a) Moffatt et al. do not disclose organic groups as presently claimed.
- (b) Ikeda et al. do not disclose preparing pigment with first chemical group by reacting a diazonium salt having first chemical group with the pigment.
- (c) WO 99/31175 discloses different organic groups than presently claimed.

With respect to argument (a), it is noted that Moffatt et al. discloses attaching a first chemical group to the pigment wherein these groups include those comprising aromatic groups (col.4, line 41-col.5, line 5) and then reacting this first chemical group with second chemical group, i.e. polymer, which includes polyethyleneimine (col.5, lines 41-56) which clearly contains the organic group recited in claim 1, i.e. imine. Thus, it is the examiner's position that Moffatt et al. do disclose organic groups as presently claimed.

With respect to argument (b), it is agreed that Ikeda et al. do not disclose preparing pigment with first chemical group by reacting a diazonium salt having first chemical group with the pigment which is why Ikeda et al. is now used in combination with WO 99/31175 which teaches using diazonium salt to attach chemical groups to pigments.

With respect to argument (c), it is noted that WO 99/31175 discloses a method of making a modified pigment comprising reacting carbon black pigment which has an attached organic group which has an attached ionic or ionizable group with at least one polymer which attaches to the ionic or ionizable group. It is disclosed that the organic group includes aromatic group or amide group, the ionic group includes sulfonates and amines, and the polymer is, for instance, obtained from amide group (page 5, lines 13-25 and page 12, line 18-page 13, line 31). Given that these organic groups disclosed by WO 99/31175 are the same as those disclosed in present claim 1, it is the examiner's position that WO 98/31175 does disclose organic groups as presently claimed.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 703-305-0208. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 703-306-2777. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Callie E. Shosho
Examiner
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7/10/02

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